

AMENDMENTS TO THE CLAIMS

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Please amend Claim 1 as follows:

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(Amended) Claim 1. A shoring device, said shoring device comprising:

(A) ~~[[A]]~~ a piston and a cylinder, said cylinder partially enclosing said piston, said piston and said cylinder each comprising an interior wall, said cylinder having a longitudinal axis and said piston having a longitudinal axis, said piston and said cylinder each comprising a distal end and a proximal end, said piston and

15 said cylinder each comprising an exterior wall, each said piston and cylinder comprising an interior wall and a pre-determined wall thickness,

(B) ~~[[At]]~~ at least one straight metal cam pin, and

(C) ~~[[A]]~~ a mechanical device, said mechanical device encircling said piston and said cylinder,

20 ~~Wherein~~ said mechanical device compris~~[[es]]~~ing in combination,

(1) ~~[[An]]~~ an outer cam collar, said outer cam collar comprising ~~[[a]]~~ an abutting penetrating component element, said abutting element penetrating said outer cam collar, said outer cam collar movably positioned along said longitudinal axis of said piston, said outer cam collar engaging said cylinder and said piston,

25 (2) ~~[[An]]~~ an inner ring, said inner ring attached to and encircling said cylinder, said inner ring comprising an inner ring circumference, said inner ring comprising a continuous circular indentation along said inner ring circumference, said continuous circular indentation comprising an indentation floor, said continuous circular indentation

comprising a depth and a width, said inner ring further comprising a abutting component,
said outer cam collar concentrically enclosing said inner ring,

~~Whereby said outer cam collar is prevented from rotation by said penetrating component~~
~~abutting said indentation floor, Whereby said piston is prevented from rotation by said~~

5 ~~penetrating component abutting said indentation floor through friction, and~~

~~Whereby said abutting component abuts said piston and prevents said piston from~~
~~becoming a projectile.~~

whereby said abutting element prevents rotational movement of said cylinder relative to
said piston by tightly abutting said indentation floor.

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Please amend Claim 2 as follows:

(Amended) Claim 2. A shoring device as described in Claim 1, wherein said ~~penetrating~~
abutting component element is a flat threaded pin.

15 Please amend Claim 3 as follows:

(Amended) Claim 3. A shoring device as described in Claim 2, wherein said ~~inner ring~~
outer cam collar comprises a threaded wall aperture, said threaded wall aperture adapted
to reversibly receive said flat threaded pin. ~~abutting component is an inner continuous~~
~~circular lip.~~

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Please amend Claim 4 as follows:

(Amended) Claim 4. A shoring device as described in Claim 3, wherein said outer cam collar comprises a plurality of handles, said outer cam collar further comprising an integral threaded boss for insertion of said flat threaded pin.

5 Please amend Claim 5 as follows:

(Amended) Claim 5. A shoring device as described in Claim ~~2~~ 1, said shoring device further comprising at least one U-shaped removable side plate, said U-shaped removable side plate reversibly attaching to said cylinder or said piston by insertion of a détente pin through ~~a plurality of apertures~~.

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Please amend Claim 6 as follows:

(Amended) Claim 6. The shoring device as described as described in Claim ~~[[3]]~~ 1, wherein said outer cam collar comprises a first and a second cam stop face, ~~at least one of each~~ said cam stop face ~~faces~~ adapted to tightly abut ~~abutting~~ said a straight metal cam
15 pin inserted through said device ~~, said straight metal cam pin thereby preventing rotation of said cylinder relative to said piston .~~

Please amend Claim 7 as follows:

(Amended) Claim 7. A shoring device as described in Claim ~~[[3]]~~ 1, wherein said
20 shoring device expands longitudinally ~~and axially~~ by extrinsic air pressure, said air pressure entering said cylinder at only one specific numerical value.

Please amend Claim 8 as follows:

(Amended) Claim 8. The shoring device as described in Claim 5, wherein said circular continuous indentation comprises a first indentation wall and a second indentation wall, said first and second indentation walls being perpendicular to said circular continuous indentation floor.

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Please amend Claim 9 as follows:

(Amended) Claim 9. The shoring device as described in Claim ~~[[6]]~~ 8, wherein said first indentation wall and said second indentations wall~~[[s]]~~ are each approximately one-eighth inch in height and said indentation floor is approximately three-quarters inch in
10 width and smooth.

Please amend allowed Claim 10 as follows:

(Allowed) 10. A pneumatic shoring device for shoring of trenches comprising

(A) ~~[[A]]~~ a cylinder which is hollow and cylindrical in shape, said cylinder comprising a
15 removable attachable cylinder swivel side plate at a proximal cylinder end, said attachable cylinder swivel proximal side plate engaging with a shoring board lining a wall, said cylinder further comprising an inlet for pressurized gas at a single numerical value from an exterior source, said cylinder further comprising a cylindrical plug,

20 (B) ~~[[A]]~~ a piston, said piston being hollow and cylindrical in shape, said piston comprising a lesser diameter than said cylinder, said piston comprising a removable swivel distal piston side plate at said distal piston end for engagement with wooden

boards, said piston further comprising a piston rubber end cup, said piston rubber end cup secured at said proximal end of said piston,

(a) said rubber piston end cup creating an airseal,

(b) said piston comprising a plurality of linearly aligned axial longitudinal apertures,

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(C) [[An]] an outer cam collar, said outer cam collar comprising a collar interior surface, said collar interior surface comprising one distal step and one proximal step, said distal step comprising a narrow diameter than said proximal step, said distal step abutting said proximal end of said piston when said piston is axially inserted into said cylinder,

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(1) [[Said]] said outer cam collar rotating around said distal end of said cylinder, said outer cam collar having an axially extending distal edge surrounding said piston, said distal edge comprising a cam surface comprising two vertical stop faces and two continuous sloping cam surfaces,

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(2) [[Said]] said outer cam collar further comprising in combination an abutting element, said abutting element comprising a threaded pin,

(D) [[An]] an inner ring, said inner ring comprising a hollow cylindrical segment, said inner ring enclosing said distal cylinder end, said inner ring attaching to said cylinder with mechanical fasteners, said inner ring positioned concentrically beneath said outer cam collar whenever said pneumatic shoring device is fully assembled, said inner ring comprising a proximal edge and a distal edge, said inner ring comprising at least one

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circumference which is parallel to said proximal edge and said distal edge, said inner ring further comprising

(a) a continuous circular indentation along said circumference of said inner ring, said continuous circular indentation comprising a smooth continuous indentation floor, said continuous circular indentation comprising a first perpendicular wall and a second perpendicular wall, said continuous circular indentation being uniform in width and depth, said first and second perpendicular walls being perpendicular to said smooth continuous indentation floor, said inner ring comprising apertures for at least two set screws,

(b) said threaded pin penetrating said exterior cam collar wall and tightly abutting said smooth continuous indentation floor, said inner ring thereby stabilizing said outer cam collar rotationally, whenever said piston is inserted within said cylinder,

(E) ~~[[A]]~~ a straight metal cam pin, said straight metal cam pin reversibly inserting within one pair of opposing apertures within said piston,

~~Whereby~~ whereby after introduction of pressurized gas into said cylinder, said piston extends laterally after said piston rubber end cup creates an air seal, said piston and cylinder being secured in the resulting extended condition by said straight metal cam pin abutting said cam surface, said threaded cam pin abutting said circular continuous indentation and said inner continuous longitudinal lip abutting said piston.

Please amend Claim 11 as follows:

(Amended) Claim 11. The shoring device as described in Claim [[1]] 10 wherein said inner ring and said outer ~~[[ring]] cam collar comprise~~ comprises aluminum 6063.

Please amend Claim 12 as follows:

- 5 (Amended) Claim 12. The shoring device as described in Claim [[1]] 10 wherein ~~said piston and said cylinder comprise aluminum~~ the extrinsic air pressure value ranges from approximately 115 pounds per square inch to 150 pounds per square inch.

Please amend Claim 13 as follows:

- 10 (Amended) Claim 13. The shoring device as described in Claim [[1]] 10 wherein said threaded pin comprises a threaded pin handle and a threaded stem, said threaded stem inserting within said threaded handle. ~~inner ring and outer cam collar comprise~~ aluminum.

- 15 Please amend allowed Claim 14 as follows:

(Amended) Claim 14. The pneumatic device as described in Claim 10 wherein said inner ring and outer cam collar ~~comprising~~ comprise aluminum ~~356-T~~ sand castings.

Please amend Claim 15 as follows:

- 20 (Amended) Claim 15. The shoring device as described in Claim [[1]] 10 wherein ~~said cylinders and pistons comprise aluminum type 6061-T6~~ said flat threaded pin comprises a furthestmost stem point, said furthestmost stem point abutting said continuous indentation floor, said furthestmost stem point adapted to fit snugly between said indentation walls.

(Allowed) Claim 16. The pneumatic shoring device as described in Claim 10 wherein said cylinders and said pistons comprise aluminum type 6061-T6.

Please amend allowed Claim 17 as follows:

- 5 (Allowed) Claim 17. The pneumatic shoring device as described in Claim 10 wherein said threaded cam pin comprises a ~~356-T~~ 356-T6 sand casting.

Please amend allowed Claim 18 as follows:

- (Allowed) Claim 18. The pneumatic shoring device as described in Claim 10 wherein
10 said cylinders and said pistons and said inner ring comprise aluminum type 6061-T6 ~~and~~
~~said inner ring~~, said outer cam collar and said threaded pin comprising aluminum 356-T
sand castings.

Please amend Claim 19 as follows.

- 15 (Amended) Claim 19. The pneumatic shoring device as described in Claim 10 wherein
~~said cylinder end plug comprises a circular groove, said circular groove containing an O-~~
~~ring~~ said device is approximately 25 inches in length when fully retracted and
approximately thirty inches in length when fully extended.

- 20 (Allowed) Claim 20. The pneumatic shoring device as described in Claim 19 wherein
~~said piston end cup comprises neoprene rubber~~ said piston is approximately thirteen
inches in length and approximately two and one-quarter inches in inner diameter.

Please amend allowed Claim 21 as follows:

(Allowed) Claim 21. The pneumatic shoring device as described in Claim 20 wherein said ~~cylinder end comprises a 356-T aluminum sand casting~~ circular continuous indentation is approximately three-quarter inch in width and approximately 1/8 inch in depth.

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BRIEF

I. Double patenting under 35 U.S.C. section 103

- 10 A. The claims of Applicant's later filed application are patentably distinct from the claims of his first filed and issued patent.

To overcome obvious-type double patenting patent rejections, application claims must be non-obvious (i.e., patentably distinct) compared to the claims of the related issued patent (of the same inventive entity). See In re Goodman, 11 F.3d 1046, 1052, 29 U.S.P.Q.2d 15 2010, 2015-16 (Fed Cir.1993). The first patent's disclosure is not prior art, although the disclosure determines claim meaning. In re Avery, 518 F.2d 1228, 1232, 186 USPQ 161,164 (C.C.P.A. 1975). The test in a utility/utility patent-application case is whether the claimed subject matter of the second patent (or application) is an obvious variation of the claim(s) of the prior first filed patent under section 103 analysis. In re Goodman, 11 20 F.3d at 1052.

A later filed related patent expires simultaneously with the first issued parent patent, so there is no improper patent term extension, 35 U.S.C. section 154 (a) (2), (3); **Manual of Patent Examination Procedure** 707.05 (Eighth Ed. August 2001, Rev. May 2004) [hereinafter MPEP] (patent term of 20 years is measured from the filing date of the 25 earliest U.S. application for which benefit under 35 U.S.C. sections 120, 121 or 365 is claimed).

B. Legal criteria for obviousness

(1) Suggestion or teaching to combine prior art

There are three possible sources for a motivation to combine references to establish a legal conclusion of obviousness: (i) the nature of the problem to be solved; (ii) the teachings of the prior art; and (iii) the knowledge of persons of ordinary skill in the art.

5 MPEP 2143.01; In re Rouffet, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1458 (Fed. Cir.1998) (the government must specify which technology within the knowledge of one of ordinary skill in the art suggests the combination of the claimed invention).

10 The fact that one skilled in the art could modify prior art in a manner alleged by the government does not make such modification obvious. Instead, prior art must suggest the desirability of a particular modification and the government cannot be guided by hindsight. In re Fritch, 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir.1992) (flexible landscape edging device not suggested by hindsight combination of prior art).

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(2) The claimed invention as a whole must be obvious

When determining differences between prior art and the applicant's claims, the claimed invention *as a whole* must be obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1537, 218 U.S.P.Q. 871, 877 (Fed. Cir. 1983) (emphasis added). Even if a change to a
20 device appears minor, the invention which contains the change is non-obvious if the change results in previously unknown practical uses. Intel Corp. v. U.S. Int'l Trade Commission, 946 F.2d 821, 20 U.S.P.Q.2d 1161, 1173 (Fed. Cir. 1991).

(3) The prior art cannot teach away from the claimed invention

A *prima facie* case of obviousness is rebutted by prior art which, in any material respect, teaches away from the claimed invention. MPEP 2141.02. A claimed combination cannot change the principle of operation of the primary prior art reference or result in the reference becoming inoperable for its intended purpose. See In re Ratti, 270 F.2d 810, 813, 123 U.S.P.Q. 349, 351-52 (C.C.P.A. 1959)(references taught rigid devices whereas the claimed invention required resiliency). A reference which teaches away from the claimed invention does not suggest a combination of references to arrive at that invention. In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1599 (Fed. Cir. 1988).

(4) All claim limitations are considered

All of an invention's claim limitations must be taught or suggested by the government's prior art. MPEP section 2143.03. When evaluating a claim for obviousness, the government must consider all claim language. In re Wilson, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970). If an independent claim is non-obvious, then any claims depending therefrom are non-obvious. In re Fine, 837 F.2d at 1076. Additional features of a subsequent claim are not obvious if they provide additional advantages to consumers. Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d 1569, 1581, 19 U.S.P.Q.2d 1241, 1250 (Fed. Cir. 1991) (second patent's claims recited additional features which achieve further advantages).

(5) Obvious to try

Prior art suggestion for virtually endless experimentation is not *prima facie* obviousness. MPEP 2145 X.B. The government must consider the inventor's research which preceded the claimed invention and give it fair evidentiary weight. In re Dow Chemical Co., 837

F.2d 469, 473, 5 U.S.P.Q.2d 1529,1532 (Fed. Cir. 1988). An invention is not obvious where the prior art gives no direction as to which of many possible experimental choices may be successful. Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d 19, 37 (D.N.J.2001), *affirmed* 320 F.3d 1339, 1354 65 U.S.P.Q.2d 1961, 5 1971 (Fed. Cir. 2003).

(6) Relevant Evidence

An applicant's declaration which describes conception and reduction to practice is relevant to a section 103 inquiry. *See Application of McKenna*, 203 F.2d 717, 720, 97 10 U.S.P.Q. 348, 350-51 (C.C.P.A. 1953). Evidence and arguments directed to the invention's advantages are relevant, even if they were not disclosed in the specification. In re Chu, 66 F.3d 292, 298-99, 36 U.S.P.Q.2d 1089, 1094-95 (Fed. Cir. 1995). The government also must consider evidence of long-felt but unsolved needs within a particular art. *See* MPEP section 2141.

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(7) Inherency

An inherent property is a characteristic which is a necessary feature or result of a prior art embodiment (which is itself sufficiently described). MPEP 2112 II.

Inherency is not established by probabilities or possibilities. MPEP 2112 IV. The 20 government must reasonably support its determination that the allegedly inherent characteristic necessarily flows from the prior art teachings. MPEP 2112 IV.

Non-obviousness may depend upon unexpected advantages from inherent properties which an invention enhances. In re Adams, 356 F.2d 998, 1002-03, 148 U.S.P.Q. 742, 745-46 (C.C.P.A.1966) (prior art did not suggest the unexpected increase in heat transfer efficiency of aqueous foam in applicant's device, although it was known that this foam *per se* transfers heat)(emphasis added). Disclosed inherent properties are part of the "as a whole" inquiry. MPEP 2141.02. Parameters which are successfully optimized in an invention to enhance an inherent property, are non-obvious when the prior art did not recognize these same parameters as the result-effective variables. *Id.*

10 II. Amended Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, and 15 are non-obvious over Claims 1 through 4 of U.S. Pat. No. 6,746,183 B1 [hereinafter '183 patent] and consequently no terminal disclaimer is necessary.

Amended Independent Claim 1

15 *There is no suggestion in Claims 1-4 for the invention of amended independent Claim 1.*

The government has not specified which technology within the knowledge of one of ordinary skill in the art suggests the continuous circular indentation and abutting element of Claim 1. It also did not specify which '183 Claim 1-4 language suggests these features which are functionally and structurally diverse from the interlocking serrations and lock member of the '183 patent. MPEP 2143.01; *see also In re Rouffet*, 149 F.3d at 1357 (the

20 government must specify which technology within the knowledge of one of ordinary skill in the art suggests the combination of the claimed invention).

Claim 1 must be reviewed as a whole and all claim language considered

The government did not consider original Claim 1 as a whole, because it focused solely upon on selected language of the claims, and did not address the continuous circular indentation and abutting element. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537.

5 It also did not consider all claim language, so amended or original Claim 1 are non-obvious on this basis. In re Wilson, 424 F.2d at 1385 (all claim language must be considered).

Furthermore, the continuous circular indentation and abutting element provides new
10 advantages for consumers based upon: (1) a reduced requirement for higher externally applied air pressure while (2) retaining the anti-projectile feature of the '183 B1 patented device. Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d at 1581 (second patent's claims recited additional features which achieve further advantages); *see also* Exhibit A (Declaration of James G. Sullivan).

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Claims 1-4 of the '183 B1 patent teach away from original and amended independent Claim 1

Claims 1 through 4 of the '183 patent teach away from original and amended Claim 1 because those claims recite interlocking components (or serrations) with a lock member.

20 However, the Claim 1 device comprises abutting element which abuts a continuous circular indentation. Consequently, the device of the original and amended Claim 1 changes the principle of operation of prior Claims 1-4. *See In re Ratti*, 270 F.2d at 813 (references taught rigid devices whereas the claimed invention required resiliency).

Because Claims 1-4 teach away from Claim 1, they do not suggest the combination for the amended or original Claim 1 inventions. In re Fine, 837 F.2d at 1074.

Applicant maintains that amended Claim 1 is not a generic claim to Claims 1-4 of the '183 patent. MPEP 806.04(d); *see* March 23, 2005 Office Action, page 6, second paragraph. Instead, amended and original Claim 1 recite an independent, patentably distinct species from that of Claims 1-4, based upon the circular continuous indentation and abutting component. In contrast, the '183 patent claims recite (1) an outer ratcheting collar with a lock member and (2) an inner ratcheting ring with interlocking components. Because original and amended Claim 1 and '183 Claims 1-4 recite mutually exclusive characteristics, they are separate species. MPEP 806.04 (f).

Furthermore, pending amended and original Claim 1 contain the limitation ---"at least one metal cam pin"-- which '183 Claim 1 does not recite. A generic claim cannot include limitations not present in each of the added species claims; conversely the species claims cannot omit limitations present in the generic claim. MPEP 804.04(d). On this second basis, neither amended nor original Claim 1 are generic to '183 Claims 1- 4.

Applicant maintains that "outer ratcheting collar" and "outer cam collar" represents more than mere semantic differences in terminology. March 23, 2005 Office Action, pages 4-6, Item 6. The specification determines the meaning of claim language.

MPEP 2111.01 III. (where the applicant provides an explicit definition for a term, that definition will control interpretation of the term as it is used in the claim).

In the pending case the '183 patent outer ratcheting collar comprises a locking member '183 Patent, col. 10, lines 30-40, Figures 2, 7, 8, and 11. In contrast, the outer cam collar of the pending invention comprises an abutting element which inserts through a threaded boss to contact the inner ring. Application, paragraphs 79- 82, Figures 7 and 10. With these fundamental structural distinctions between the outer ratcheting collar and outer cam collar, amended Claim 1 does not describe the same elements as the '183 Claims 1-4.

Undue experimentation

The government has not addressed whether those similarly skilled in trench shoring devices could have created the original Claim 1 invention of the pending application without undue experimentation. The government has also contended that the use of aluminum was obvious based upon the prior art. However, with Applicant's device there was a long selection process for appropriate materials, such as fiber reinforced composite plastic or aluminum grades. Exhibit A, Declaration of James G. Sullivan, Items 13-17.

Applicant then researched commercially available grades of aluminum alloy and selected the 6061 and 6063 types. Exhibit A, Items 18-21. As for structural design, Applicant directed a computer designer who translated Applicant's structural component drawings into mold designs. Exhibit A, Item 10. Applicant also selected the components for sand casting, extrusion, and/or treatment with an additional process for improved performance. Exhibit A, Items 11 and 20. Applicant also tested different size models at two major university engineering laboratories. Exhibit A, item 21.

Applicant designed an optimally performing threaded pin length through trial and error. He also designed a handle which easily rotates even if the operator wears thick gloves. Exhibit A, items 28, 29 and 30. He also determined that the inner ring's continuous
5 circular indentation optimal depth is the same as the maximum depth of the serrations described in the '183 patent. Exhibit A, Items 32.

In sum, '183 Claims 1-4 are inadequate guides to the result of Applicant's years of research combined with professional experience. Exhibit A, Items 1-9. Consequently,
10 Applicant's invention of amended Claim 1 is not obvious, because Claims 1-4 do not direct as to which of many possible experimental choices may succeed. Boehninger Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36.

Inherency

15 The invention of Claims 1-4 of the '183 patent does not inevitably result in Applicant's invention of original or amended Claim 1. MPEP 2112 II. Friction is inherently a potential force between contacting surfaces which can either hinder or assist a device's purpose. In the pending case Applicant's design, positioning and combination of his flat threaded pin and indentation floor maximize and focus friction advantageously for an
20 improved shoring device operation. In re Adams, 356 F.2d at 1002-03 .

Amended Claim 2

Applicant incorporates his legal positions for amended Claim 1 herein. Because independent amended Claim 1 is non-obvious, then Claim 2 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076. Amended Claim 2 limits the abutting component to a flat threaded pin, which is not suggested by '183 Claims 1-4. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government must address Claim 2 as a whole, as well as all language of amended Claim 2. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385 (all claim language must be considered).

Because Claims 1-4 teach away from amended Claim 1, they do not suggest depending amended Claim 2. See In re Ratti, 270 F.2d at 813 (references taught rigid devices whereas the claimed invention required resiliency). The government must specify why the amended Claim 2 invention is suggested by '183 Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 2 is inherently suggested by '183 Claims 1-4. In re Adams, 356 F.2d at 1002-03.

Amended Claim 3

Applicant incorporates his legal positions for amended Claims 1 and 2 herein. Because independent amended Claim 1 is non-obvious, Claim 3 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076. Amended Claim 3 further recites an outer cam collar with a threaded wall aperture for the flat threaded pin. The government must specify how the outer cam collar with a threaded wall aperture is suggested by '183 patent Claims 1-4. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357.

The government also must address amended Claim 3 as a whole, as well as all language of amended Claim 3. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385. Because Claims 1-4 teach away from amended Claim 1, they do not suggest depending amended Claim 3. *See* In re Ratti, 270 F.2d at 813. The government must also specify why the amended Claim 3 invention is suggested by '183 Claims 1-4 without undue experimentation, or why amended Claim 3 is inherently suggested by Claims 1-4. Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36; In re Adams, 356 F.2d at 1002-03.

Amended Claim 4

Amended Claim 4 recites a threaded boss for the flat threaded pin and handles for the outer cam collar. Applicant incorporates his legal positions for amended Claims 1, 2 and 3 herein. Because independent amended Claim 1 is non-obvious, then Claim 4 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076.

The government must specify how the threaded boss for a flat threaded pin is suggested by '183 patent Claims 1-4. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government must address Claim 4 as a whole, as well as all language of amended Claim 4. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

Because Claims 1-4 of the '183 patent teach away from amended Claim 1, they do not suggest depending amended Claim 4. In re Ratti, 270 F.2d at 813. The government must

specify why the amended Claim 4 invention is suggested by '183 Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 4 is inherently suggested by '183 Claims 1-4. In re Adams, 356 F.2d at 1002-03.

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Amended Claim 5

Amended Claim 5 includes the additional limitation of at least one U-shaped removable side plate which attaches to the cylinder or piston. Applicant incorporates his legal positions for amended Claims 1 herein. Because independent amended Claim 1 is non-
10 obvious, then Claim 5 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076.

The government must specify how amended Claim 5 is suggested or taught by '183 patent Claims 1-4. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government also must address Claim 5 as a whole, as well as all language of amended Claim 5. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385. Because prior
15 Claims 1-4 teach away from amended Claim 1, they do not suggest depending amended Claim 5. See In re Ratti, 270 F.2d at 813.

The government must also specify why the amended Claim 5 invention is suggested by
20 '183 Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 5 is inherently taught by '183 Claims 1-4. In re Adams, 356 F.2d at 1002-03.

Amended Claim 6

Amended Claim 6 recites cam stop faces which abut a straight metal cam pin. Applicant incorporates his legal position for amended Claim 1 herein. Because independent amended Claim 1 is non-obvious, then Claim 6 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076.

Even so, the government cannot specify how amended Claims 6 limitations are suggested by '183 patent Claims 1-4. 'General teachings', *see* February 23, 2005 Office Action, page 6, second paragraph, line 3, is not the proper standard for obviousness when combining prior art references. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government also must address Claim 6 as a whole, as well as all language of amended Claim 6. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

Because prior Claims 1-4 teach away from amended Claim 1, they do not suggest amended Claim 6. *See In re Ratti*, 270 F.2d at 813. Even so, the government cannot specify why the amended Claim 6 invention is suggested by '183 Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 6 is inherently taught by '183 Claims 1-4. In re Adams, 356 F.2d at 1002-03.

Amended Claim 7

Amended Claim 7 recites a single numerical value for extrinsic air pressure. Applicant incorporates his legal position for amended Claim 1 herein. Because independent amended Claim 1 is non-obvious, then Claim 7 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076.

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Even so, the government cannot specify how amended Claims 7 limitations are suggested by '183 patent Claims 1-4. 'General teachings,' *see* February 23, 2005 Office Action, page 6, second paragraph, line 3, is not the proper review for obviousness when combining prior art references. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government also must address Claim 7 as a whole, as well as all language of amended Claim 7. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

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Because Claims 1-4 teach away from amended Claim 1, they do not suggest amended Claim 7. In re Ratti, 270 F.2d at 813. The government must also specify why the amended Claim 7 invention is suggested by '183 Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 7 is inherently taught by '183 Claims 1-4. In re Adams, 356 F.2d at 1002-03.

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Amended Claim 8

Amended Claim 8 recites perpendicular indentation walls. Applicant incorporates his legal positions for amended Claims 1, 2, 3, 4 and 5 herein. Because independent amended

Claim 1 is non-obvious, then Claim 8 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076.

Even so, the government must specify how amended Claims 8's limitations are suggested by '183 patent Claims 1-4. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government also must address Claim 8 as a whole, as well as all language of amended Claim 8. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

Because prior Claims 1-4 teach away from amended Claim 1, they do not suggest amended Claim 8. See In re Ratti, 270 F.2d at 813. The government must also specify why the amended Claim 8 invention is suggested by prior '183 Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 8 is inherently taught by '183 Claims 1-4. In re Adams, 356 F.2d at 1002-03.

Amended Claim 9

Amended Claim 9 includes limitations of specific indentation wall heights and indentation floor width. Applicant incorporates his legal positions for amended Claims 1, 2, 3, 4, 5, and 8 herein. Because independent amended Claim 1 is non-obvious, then Claim 9 depending therefrom is non-obvious. In re Fine, 837 F.2d at 1076.

The government must specify how amended Claims 9 limitations are suggested by ‘183 patent Claims 1-4. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government also must address amended Claim 9 as a whole, as well as all amended Claim 9 language. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

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Because prior ‘183 patent Claims 1-4 teach away from amended Claim 1, they do not suggest depending amended Claim 9. *See* In re Ratti, 270 F.2d at 813. The government must specify why amended Claim 9 is suggested by ‘183 patent Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 9 is inherently taught by ‘183 patent Claims 1-4. In re Adams, 356 F.2d at 1002-03.

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Amended Claim 11

Applicant has modified amended Claim 11 to read “outer cam collar” for consistency with amended Claim 1 and the specification. Application, pars. 72, 73, 74, 75, 77, 79, 81 and 82. Amended Claim 11 now depends from allowed independent Claim 10, so amended Claim 11 is non-obvious. In re Fine, 837 F.2d at 1076.

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Even so, the government cannot explain how prior Claims 1-4 specifically suggest amended Claim 11. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government must address amended Claim 11 as a whole, as well as all amended Claim 11 language. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

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Prior '183 patent Claims 1-4 teach away from allowed Claim 10, because they suggest an interlocking mechanism. In contrast, Claim 10 recites a frictional mechanism for preventing rotation. Because prior Claims 1-4 teach away from allowed Claim 10, they also teach away from depending amended Claim 11. See In re Ratti, 270 F.2d at 813.

5 The government must also specify why amended Claim 11 is suggested by '183 patent Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 11 is inherently taught by '183 patent Claims 1-4. In re Adams, 356 F.2d at 1002-03.

10 **Amended Claim 12**

Amended Claim 12 now depends from allowed independent Claim 10 and is now non-obvious. In re Fine, 837 F.2d at 1076. Even so, the government cannot explain how prior Claims 1-4 specifically suggest amended Claim 12 with its specific extrinsic air pressure values. MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government must address
15 amended Claim 12 as a whole, as well as all amended Claim 12 language. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

Prior '183 patent Claims 1-4 teach away from allowed Claim 10, because they teach an interlocking mechanism while Claim 10 recites a frictional mechanism for preventing
20 rotation. Because prior Claims 1-4 teach away from allowed Claim 10, they also teach away from depending amended Claim 12. See In re Ratti, 270 F.2d at 813. The government must specify why amended Claim 12 is suggested by '183 patent Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-

Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 12 is inherently taught by '183 patent Claims 1-4. In re Adams, 356 F.2d at 1002-03.

Amended Claim 13

5 Amended Claim 13 depends from allowed independent Claim 10, and so amended Claim 13 is non-obvious. In re Fine, 837 F.2d at 1076. Even so, the government cannot explain how prior Claims 1-4 specifically teach amended Claim 13 with collar and ring aluminum sand castings. *See* MPEP 2143.01; In re Rouffet, 149 F.3d at 1357. The government must address amended Claim 13 as a whole, as well as all amended Claim 13
10 language. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

Because prior Claims 1-4 teach away from allowed Claim 10, they also teach away from depending amended Claim 13. *See* In re Ratti, 270 F.2d at 813. Even so the government
15 cannot specify why amended Claim 13 is suggested by '183 patent Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 13 is inherently taught by '183 patent Claims 1-4. In re Adams, 356 F.2d at 1002-03.

Amended Claim 15

20 Claim 15 depends from allowed independent Claim 10, and Claim 15 now is also non-obvious. *See* In re Fine, 837 F.2d at 1076. Furthermore, the government cannot explain how prior Claims 1-4 specifically suggest amended Claim 15. MPEP 2143.01; In re

Rouffet, 149 F.3d at 1357. The government must address amended Claim 15 as a whole, as well as all Claim 15 language. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d at 1537; In re Wilson, 424 F.2d at 1385.

- 5 Because prior Claims 1-4 teach away from Claim 10, they also teach away from depending amended Claim 15. See In re Ratti, 270 F.2d at 813. The government must specify why amended Claim 15 is suggested by '183 patent Claims 1-4 without undue experimentation, Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 166 F. Supp.2d at 36, or how amended Claim 15 is inherently taught by '183 patent Claims 1-10 4. In re Adams, 356 F.2d at 1002-03.

III. Prior Art of Record

Applicant's claims are non-obvious over the government's prior art of record for the following reasons (but not necessarily exclusively for the following reasons):

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- (1) The prior art, including combination with other prior art, does not suggest a continuous circular indentation within an inner ring combined with an outer collar which encloses a laterally expandable trench support. It also does not teach the abutting element and its relationship to the outer collar and inner ring.

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(2) None of the prior art, including combinations with the remaining prior art, suggests the above summarized outer collar, inner ring and abutting element with continuous circular indentation upon the inner ring invention as a whole.

(3) None of the prior art, including combinations with the remaining prior art, suggests the parameters to modify to arrive at Applicant's invention without undue experimentation: the modification of the inner ring and outer collar as well as the design features of the abutting element.

(4) None of the prior art of record, including combinations with remaining prior art, suggests the inherency of Applicant's invention: enhancement of a friction generating feature (the abutting element) which prevents rotation of a piston and cylinder relative to each other.

1. U.S. Pat. No. US 6,394,405 (Roxton et al.) discloses an adjustable rescue strut which is remotely controlled by pneumatic pressure. This strut includes a cylindrical outer member with a cylindrical bore for a cylindrical inner member. The cylindrical inner member has a helical groove to engage with ball bearings within a collar. The collar is located at one end of the cylindrical outer member. The collar is adjustable between a first position in which the ball bears are engaged in the helical groove, and a second position in which they disengage from the helical groove. When the ball bearings engage, the cylindrical inner and outer member rotate relative to each other to adjust the strut length or resist compression.

2. U.S. Pat. No. US 6,371,422 (St. Martin et al.) discloses a device for retaining a protective panel over a window. The device is length adjustable and includes a hollow outer section and an inner section which telescopes within. Gear teeth are longitudinally positioned upon the inner section and a cam is pivotally mounted upon the outer section.

5 The cam includes gear teeth that engage the inner section gear teeth whenever the cam rotates. The cam handle has an aperture which aligns with apertures on spaced tabs on the outer section whenever the handle lies between the tabs. At this mid-tab position, a padlock or pin penetrates the congruent apertures to maintain the bar at a predetermined length.

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3. U.S. Pat. No. US 6,256,939 (Snyder, W.) discloses a floor beam support of a building. The tubular structure contains a lock which prevents rotation of engaged parts, and the lock is located in a collar. The tubular structure also preferably contains material such as concrete which contributes to strength. The tubular components are adjustable and are
15 joined by the lock which prevents relative movement between the engaged parts.

4. U.S. Pat. No. US 5,590,863 (Sasaki) discloses a support pipe with two elongated apertures, a support ring, and insertion pipe with pin apertures and a support pin. The support ring includes (1) a main support ring member with an internal thread, and (2) an
20 upper support ring member which couples to the upper support ring member. A rotary operated handle fits to the main support ring member periphery.

When the insertion pipe inserts within the support pipe, both ends of the support pin insert within elongated apertures. Whenever one pair of apertures is located upon the upper support ring member, the insertion pipe is thereby supported by the support pipe by the adjustable height feature. To move the insertion pipe vertically downward, the main support ring member rotates by the rotary operation handle, while the upper support ring member does not rotate.

5 U.S. Pat. No. 5,310,290 (Spencer) discloses a panel structure which buttresses the upright walls of an excavation site. The panel contains alternating opposing opening longitudinal channels, and a brace assembly supports the panel against an upright excavation wall.

A pair of opposing protective panels on opposite sides of an excavation connect to mounting stations which also oppose each other. Spreader beams extend between the mounting stations, and these spreader beams are manually adjustable in length. Spreader beams are mechanically adjusted by pneumatic or hydraulic power. Spreader beams are mounted in sockets to retain the protective panels against the excavation walls.

Legs include tubular portions which telescopically receive a transverse rigid member. The opposite ends of each rigidifying member have diametric apertures. A lower foot is located at the free end of each tubular portion. Each tubular portion contains pairs of diametric apertures which align with corresponding apertures to receive the keeper pin, thereby retaining each leg in a selected, adjustable extended length.

6. U.S. Pat. No. US 5,199,824 (Smith et al.) discloses an excavation shoring system with removable stop pins. These stop pins adjust the vertical height of longitudinal and lateral beams within the system. Stop pins insert through congruently aligned apertures within the upward ends of base posts and lower ends of connecting sleeves. After insertion the corresponding corners of the modular support frame base are locked together. The entire frame base is then lifted and positioned in the excavation pit for continued assembly.

7. U.S. Pat. No. US 5,094,576 (Fredelius) discloses a telescopic cargo bar comprising an outer tube and an interior 'profile.' The outer tube contains a rack and cooperating gear segment for bracing against a ceiling or floor. The outer tube exterior mounts to a latch assembly with a control handle, the gear segment and a latch bolt.

By pressing the latch bolt against a spring's tension, the first stop of the handle moves brought past a first stop face on the latch bolt. The handle then pivots upwards until a second stop on the handle abuts a second stop face on the latch bolt. In this second latching position the gear segment still engages the rack and the profile is prevented from sliding into the tube.

8. U.S. Pat. No. US 4,486,050 (Snyder, L.) discloses a rectangular boring machine and method for creating tunnels with opposing sidewalls. A cutting wheel component of the machine rotates around its axis in a forward direction. Support shoes are mounted beneath the cutting wheel for movably supporting the cutting wheel on the tunnel floor.

Gripping assemblies for engaging the opposite tunnel sidewalls prevent axial rearward movement as the cutting wheel and support shoes advance. The entire machine advances by alternately clamping a series of gripper assemblies into the side tunnel walls. Each gripper assembly comprises two coaxial piston arms which are independently operable, and each extends in an opposite direction from the other towards the opposing tunnel wall.

The pistons have hollow bores for holding a shaft in a fixed position. The pistons are also mounted within a cylinder bore in a retractable sliding relationship with fluid entrance and exhaust ports. In another embodiment, each external thrust cylinder contains a conventional extending and retractable piston which attaches to a movable shaft member by a fixed collar and trunnion.

9. U.S. Pat. No. US 4,441,736 (Shedden) discloses a device for reducing wear in vehicle suspension systems. A pair of adjustable elongated struts insert between a motorcycle chassis and a supporting wheel. The device is designed to block flexing of the suspension system whenever the motorcycle is hauled on a carrier or over rough terrain. A locking ring slides into position to engage both struts and lock them into a linear position.

One strut contains numerous equally spaced apertures along its convex section, while a single aperture appears in the corresponding section of the second lower strut. A bolt can

penetrate the single aperture and selected aperture to coarsely adjust the overall length of the device. A locking ring also encloses both struts, and in combination with the bolt, this ring locks the struts into a linear position.

- 5 10. U.S. Pat. No. US 4,375,934 (Elliott) discloses a device for lifting and positioning construction panels. This device has a base, a fixed strut supported by the base and a movable strut supported by the fixed strut. There is also (1) a guide and latch for retaining the structures parallel to each other; and (2) a handle upon the movable strut for elevating the movable strut; and (3) a rail which engaged the panel and which is
- 10 supported upon the movable strut.

There is a telescoping relationship between the fixed strut, the movable strut and the guide frame. The spacing of spacer guide blocks and vertical dimension of guide plates retains the parallel adjacent positions of the movable and fixed struts. There is a cross

15 handle attached to the movable strut above a guide frame, to elevate the movable strut with respect to the fixed lower strut and base. Downward movement of the movable strut is prevented by engagement of the working end of a pawl with latch teeth.

11. U.S. Pat. No. US 3,870,278 (Lee) discloses a stand jack with an upper cylinder,
- 20 intermediate telescoping cylinder, base cylinder and a lower welded support base. Both the intermediate cylinder and upper cylinder have cooperating travel and détente slot patterns for stop pins. The intermediate cylinder contains an extending pin, while the

upper cylinder has an interior threaded portion which encloses a manually rotated threaded shaft.

5 Lee also discloses a ratchet handle with a series of radial bore depressions arranged as a square. These bores have chamfered or relieved cam edges which function as cam surfaces while the ratchet handle rotates. A ratchet ring is retained by C-rings which fit within shaft grooves.

10 12. U.S. Pat. No. US 3,851,856 (Berg) discloses a shoring jacking which contains a piston and cylinder, and which expands by introduction of compressed air into the cylinder. A rotating collar with cam edges contains a threaded boss into which a threaded stud inserts. There is a handle attached to the stud, and this handle tightens the stud against the cylinder surface to prevent relative rotation of the collar relative to the cylinder.

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The cam edges lock against rotation whenever a cam edge tightly abuts a pin inserted within two aligned apertures within the piston. This pin serves as the cam element and inserts through piston apertures which are most proximal to cam stop surfaces along the cam edges. The collar then locks when the operator rotates the handle to engage the stud
20 with cylinder. The device remains in an extended position by abutment of the pin with the cam surfaces.

13. U.S. Pat. No. US 3,362,168 (Dotlich) discloses a trench wall retainer with a laterally extending cross beam containing longitudinally spaced apertures. Skid means adjustably connect to the cross beam by selective insertion of key pins within one of the longitudinally spaced apertures. The key pins extend below the cross beam and engage
5 the spaced panel walls by their shank portions.

14. U.S. Pat. No. 1,170,992 (Purdy) discloses a lifting jack which telescopes and collapses into a shell. A pin engages a notch after which, by the swinging of a lever to a horizontal position, forked arms engage a ratchet wheel's teeth. The ratchet wheel can
10 rotate in both directions, causing a set screw to rotate and be raised or lowered.

A yoke engages a flange and ratchet wheel, and it also holds them together with ball bearings. The ratchet wheel has an interior opening which engages the set screw. The under surface of this set screw has a semi-spherical bearing for a second ball bearing.
15 This second ball bearing also engages a raceway in the upper surface of the flange of the telescoping shell.

15. Number 2231353 (Collins)(Great Britain) discloses a strongbox which supports the sides of an excavation trench. The strongbox comprises a pair of panels interconnected
20 by adjustable struts, as well as a joint for limited pivotal movement between a strut and a panel. Each strut connects to two panels by two respective universal joints and two respective sets of leaf-springs.

Each strut also comprises two bolted sleeves and two separate shafts. Each sleeve contains apertures for receiving a handle to extend and retract the strut. Turning of a sleeve by the handle extends or retracts a shaft into or away from the sleeve, depending upon the direction of the sleeve rotation. Cantilever springs exert a damping upon (1) angular movements between the panels and struts, and (2) any deviation from the perpendicular orientation of the strut relative to the panel.

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